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PRACTICAL PLASMA SPRAYING

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In the past, numerous papers have been presented on the use of plasma spray equipment for the application of refractory material coatings. The coatings are used to protect substrates from oxidation, erosion, etc., or are built up to considerable thicknesses to provide hardware of one kind or another. Some of these latter applications are presented in the following discussion.

Case I.

Tungsten parts used in high temperature vacuum furnaces sometimes undergo dimensional decreases on hot surfaces due to evaporation. Such parts are selectively tungsten sprayed to rebuild these surfaces (see Fig. 1) and then reground (if necessary) to original dimensions. Since duplication of such parts usually involves many grinding operations, the savings offered by this technique are easily appreciated.

Case II.

In a high temperature rolling program, molybdenum rolls are being used for rolling as-sintered tungsten strip which is preheated to very high temperatures before each pass. The molybdenum has a tendency to become scored after several runs and the roll surface is then reground to eliminate these imperfections. After many such grinding operations, the roll diameter is reduced so much that it can no longer be compensated for by mill adjustments. At this point, the rolls were useless, (Fig. 2). However, by plasma spraying a tungsten layer on them, we increased their diameters and also provided a surface which is less susceptible to damage, (Fig. 3).

Case III.

An experimental effort has just begun to protect tungsten extrusion billets by canning prior to processing. However, instead of the usual welded can, we are attempting to "plasma-can" our billets with sprayed molybdenum.

Thus, even though most research time on the plasma spray equipment is devoted towards coatings research, other areas of materials research may also profit from plasma sprayed applications.

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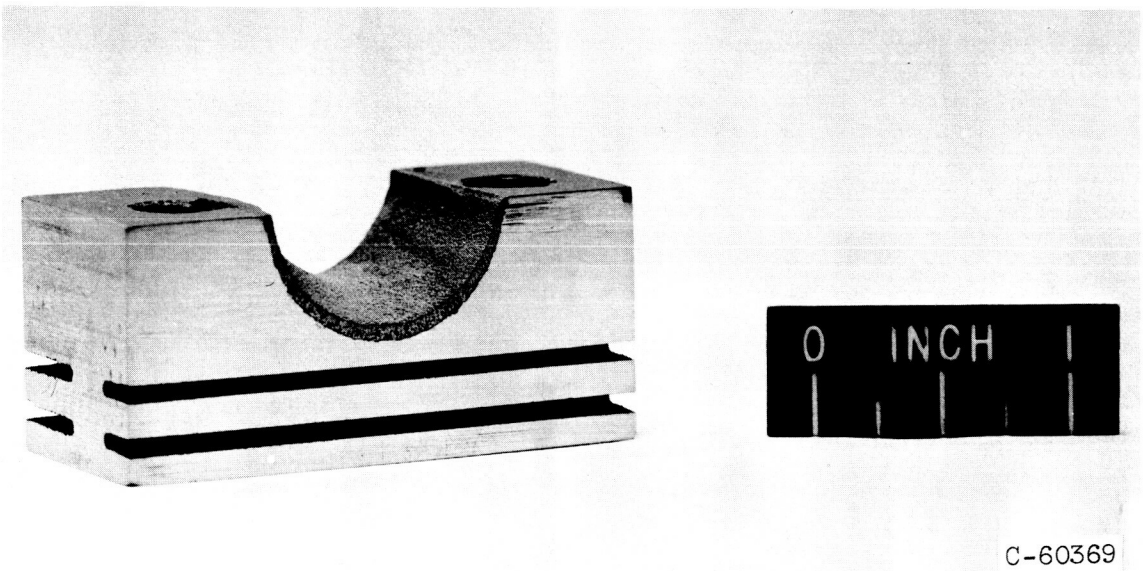

Fig. 1. Rebuilt tungsten furnace part- as sprayed.

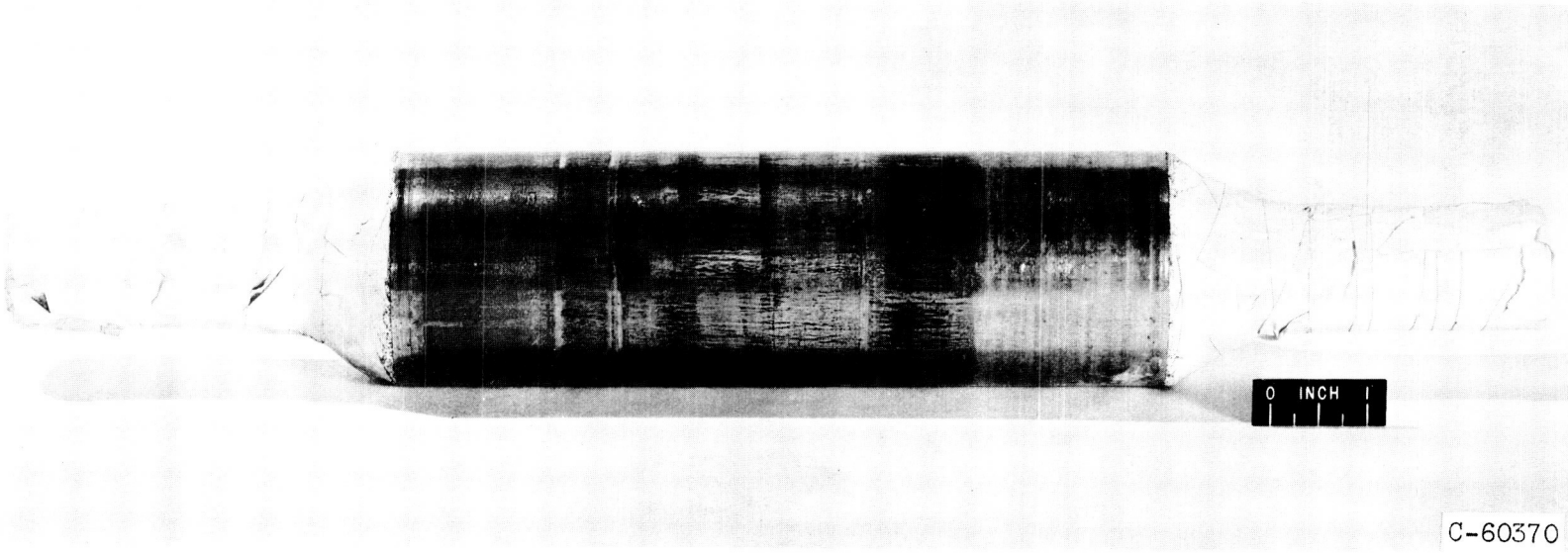

Fig. 2. Scored molybdenum roll.

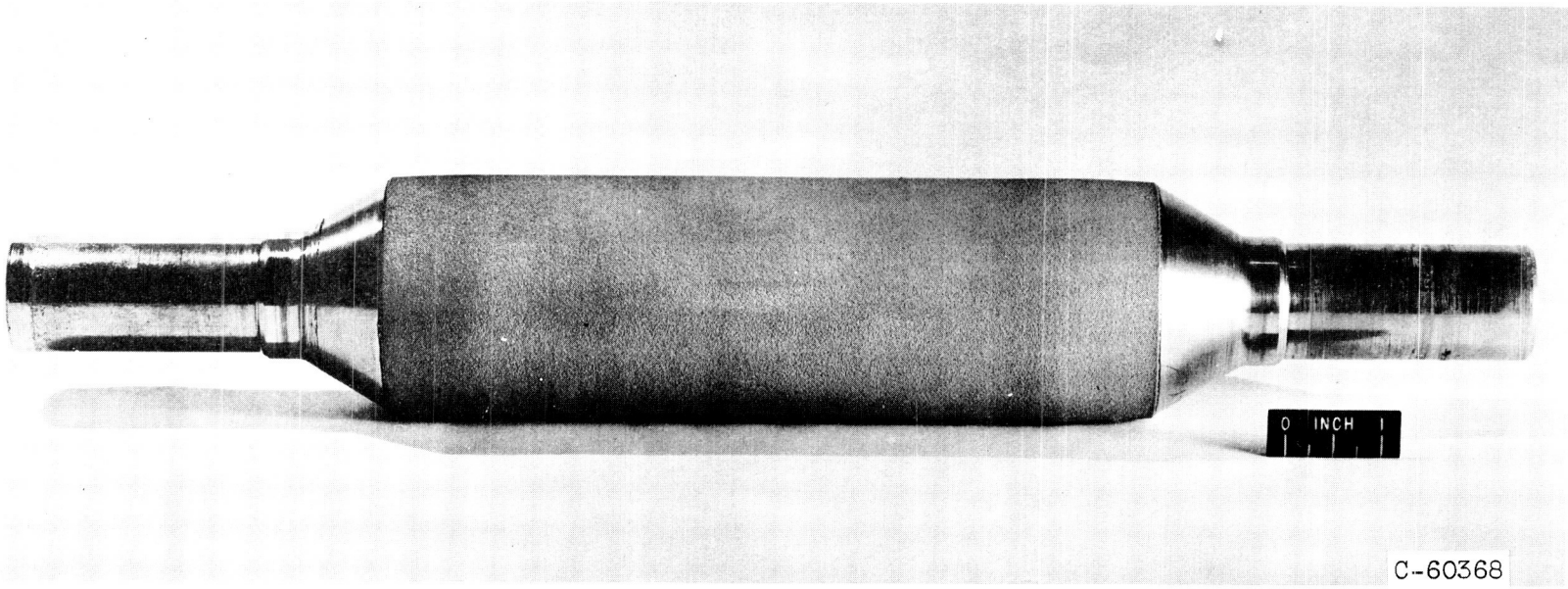

Fig. 3. Tungsten sprayed roll.